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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/896,432	06/29/2001	Edward Paul Cernocky	SOC-105	8240
23632	7590	08/06/2008		
SHELL OIL COMPANY P O BOX 2463 HOUSTON, TX 772522463			EXAMINER GREENE, DANIEL LAWSON	
			ART UNIT 3694	PAPER NUMBER
			MAIL DATE 08/06/2008	DELIVERY MODE PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* EDWARD PAUL CERNOCKY and ALLEN J. LINDFORS

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Appeal 2008-1483  
Application 09/896,432  
Technology Center 3600

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Decided: August 6, 2008

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*Before:* WILLIAM F. PATE, III, HUBERT C. LORIN and  
STEVEN D.A. McCARTHY, *Administrative Patent Judges.*

McCARTHY, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

1  
2       The Appellants appeal under 35 U.S.C. § 134 (2002) from the final  
3 rejection of claims 1-14. We have jurisdiction under 35 U.S.C § 6(b)  
4 (2002). We AFFIRM.

The claims on appeal relate to the perforation of a casing string in a well to provide fluids contained in a subterranean formation access to the interior of the casing. (Spec. 1, ll. 14-16 and 6, l. 21 – 7, l. 1). Claim 1 is typical of the appealed claims:

1. A detonation device for selectively perforating a tubular with a designated explosive charge located downhole in a well bore, said device comprising:

- the tubular;
- the designated explosive charge attached to the tubular;
- a wireless receiver;
- microprocessor and control means connected to said wireless receiver;
- an explosive bridge wire;
- high voltage supply means; and energy storage and trigger means, whereby a coded signal received by said wireless receiver is decoded by the micro processor and, if the code designates that the respective explosive charge is to be detonated, sends a signal to the trigger means which will supply high voltage to explosive bridge wire which will create sufficient energy to initiate detonation of the respective explosive charge and thereby perforating the tubular.

## ISSUES

The issues before us are whether the Appellants have shown that the Examiner erred in:

rejecting claims 1-5 and 7 under 35 U.S.C. § 103(a) (2002) as being unpatentable over Snider (Publ. WO 00/65195, published 2

Nov. 2000) in view of Guerreri (U.S. Patent 4,884,506, issued 5 Dec. 1989);

rejecting claim 6 under § 103(a) as being unpatentable over Snider in view of Guerreri and Neyer (U.S. Patent 6,234,081, issued 22 May 2001);

rejecting claims 8-12 and 14 under § 103(a) as being unpatentable over Snider in view of Abouav (U.S. Patent 5,090,321, issued 25 Feb. 1992) and Guerreri, alone or further in view of Umphries (U.S. Patent 5,295,544, issued 22 Mar. 1994); and

rejecting claim 13 under section 103(a) as being unpatentable over Snider in view of Abouav, Guerreri and Neyer, alone or further in view of Umphries.

These issues turn, at least in part, on whether: (1) Snider and Guerreri are analogous art; (2) the Examiner has articulated reasoning sufficient to support the conclusion that the detonation devices of claims 1-5 and 7 would have been obvious from the teachings of Snider and Guerreri along with common knowledge in the art regarding the use of exploding bridge wire detonators; and (3) whether the Examiner has articulated reasoning sufficient to support the conclusion that the methods of claims 8-12 and 14 including the step of attaching an explosive charge in direct contact with the tubular would have been obvious from the teachings of Snider, Abouav, Guerreri and Umphries.

#### FINDINGS OF FACT

The record supports the following findings of fact (“FF”) by a preponderance of the evidence.

1           1.     Snider teaches a method including the steps of positioning a  
2     perforating gun assembly in a subterranean well bore outside of the casing  
3     and detonating an explosive charge in the perforating gun assembly to  
4     penetrate the casing wall. (Snider 12, ll. 4-7).

5           2.     Snider further teaches detonating charges in multiple  
6     perforating guns positioned adjacent subterranean zones of interest  
7     simultaneously, sequentially or in any desired order by transmitting suitable  
8     electrical, hydraulic or acoustic signals to the guns. (Snider 14, ll. 10-14).

9           3.     In particular, the reference teaches igniting the charges by  
10    sending electromagnetic signals through the casing, the soil or the well bore  
11    fluids to receivers connected to the perforating guns. (Snider 9, ll. 22-28).

12          4.     Snider teaches securing a perforating gun to a casing by means  
13    of stainless steel bands or specialty connectors. (Snider 9, ll. 6-12).

14          5.     Guerreri teaches a detonating system which includes a  
15    command unit and one or more control units. (Guerreri, col. 3, ll. 19-21).

16          6.     Each control unit includes a radio receiver for receiving radio  
17    signals from the command unit and a processor-decoder means for  
18    recognizing signals containing an identifying code provided to the unit. (*Id.*;  
19    Guerreri, col. 4, ll. 15-22, 27-29 and 52-57).

20          7.     The processor-decoder means places the control unit on alert  
21    status in response to wireless arming signals including the control unit's  
22    identifying code. (Guerreri, col. 4, ll. 57-61 and col. 5, ll. 21-25).

23          8.     The processor-decoder means of the alerted control units  
24    subsequently arm firing mechanisms of the control units and signal the firing  
25    mechanisms to detonate explosive charges in response to arming and firing

1 signals sent from the command unit. (Guerreri, col. 4, ll. 18-22; col. 5, ll.  
2 50-56; and col. 6, ll. 40-50).

3 9. Guerreri teaches that the radio signals sent by the command  
4 unit to the control units must be distinctive so that the control units do not  
5 place themselves on alert status, arm their firing mechanisms or detonate  
6 their explosive charges in response to random signals or signals directed to  
7 other control units. (Guerreri, col. 4, ll. 22-27).

8 10. Guerreri teaches that the “firing mechanism itself is of  
9 conventional type.” (Guerreri, col. 6, ll. 57-60). In Guerreri’s preferred  
10 firing mechanism, activation of a switch causes a capacitor to discharge into  
11 a firing circuit so as to cause an electric blasting cap to detonate an explosive  
12 charge. (Guerreri, col. 6, ll. 60-63).

13 11. Umphries discloses a six-way decentralized casing hole  
14 puncher. (Umphries, col. 3, ll. 58-61).

15 12. Umphries teaches controlling the explosive force of a  
16 perforation charge by varying the distance between the charge and the casing  
17 wall. (Umphries, col. 2, ll. 29-32).

18 13. In particular, the reference teaches that the force generated  
19 when the charge is spaced a short distance away from the casing wall will be  
20 more of a destructive force whereas the force resulting from the intimate  
21 contact of the explosive charge with the casing wall will be more of a  
22 deformation force. (Umphries, col. 5, ll. 14-22). The reference further  
23 teaches placing the explosive charge in intimate contact with the wall of a  
24 pipe casing so as to punch the inner casing only and not a protective casing  
25 surrounding the pipe casing. (Umphries, col. 5, ll. 9-14).

PRINCIPLES OF LAW

A claim is unpatentable for obviousness under 35 U.S.C. § 103(a) if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” In *Graham v. John Deere Co.*, 383 U.S. 1 (1966), the Supreme Court set out factors to be considered in determining whether claimed subject matter would have been obvious:

[U]nder § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.

*Id.*, 383 U.S. at 17.

ANALYSIS

A. *The Rejection of Claims 1-5 and 7 Under § 103(a) as Being Unpatentable Over Snider in View of Guerreri*

The Appellants contest the rejection of claims 1-5 and 7 together in the Appeal Brief. (App. Br. 9.) We select claim 1 to be representative of the group. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2007). The Appellants contend that: (1) Snider and Guerreri are not analogous art (App. Br. 10-11; Reply Br. 4-5); (2) there is no suggestion to combine the teachings of Snider and Guerreri (App. Br. 10; Reply Br. 3); and (3) neither Snider nor Guerreri

1 teaches an explosive bridge wire detonator (App. Br. 11). We sustain this  
2 ground of rejection.

3         At the outset, we emphasize that the issue of whether cited prior art is  
4 analogous is separate from the issue of whether the Examiner has articulated  
5 reasoning to sufficient to support combining the teachings of the references.  
6 The established precedent of our reviewing court sets up a two-fold test for  
7 determining whether art is analogous: “First, we decide if the reference is  
8 within the field of the *inventor*’s endeavor. If it is not, we proceed to  
9 determine whether the reference is reasonably pertinent to the particular  
10 problem with which the *inventor* was involved.” *In re Deminski*, 796 F.2d  
11 436, 442 (Fed. Cir. 1986) (emphasis added).

12         The single passage from Snider cited by the Appellants in support of  
13 their contention that Snider is nonanalogous art (*see* App. Br. 10; Reply Br.  
14 5) suggests that Snider lies within the Appellants’ field of endeavor rather  
15 than without. Comparing this passage to the preamble of claim 1, we  
16 conclude that the Appellants have not shown that the Examiner erred in  
17 finding that Snider is analogous art.

18         The Appellants contend that Guerreri is not within the field of the  
19 Appellants’ endeavor because the teachings of Guerreri address the problem  
20 of remotely detonating explosives in environments having high levels of  
21 extraneous electricity (Guerreri, col. 2, ll. 14-17) and any extraneous  
22 electrical fields in a well bore tubular would not be as strong as those in an  
23 urban area as described by Guerreri. (App. Br. 10). We conclude that the  
24 teachings of Guerreri are within the Appellants’ field of endeavor. Both the  
25 subject matter of claim 1 and the teachings of Guerreri relate to detonation  
26 devices including wireless receivers and processors. (*See* FF 5-6). In both



1 the detonation device of claim 1 and the detonating system of Guerreri, a  
2 coded signal received by the wireless receiver must be received and decoded  
3 by the microprocessor before the explosive charge can be detonated. (*See*  
4 FF 7-8). In Guerreri's system as in the device of claim 1, voltage supplied  
5 by the trigger means creates sufficient energy to initiate detonation of the  
6 explosive charge. (FF 10). Since the subject matter of claim 1 and the  
7 system taught by Guerreri are similar in structure and function, the teachings  
8 of Guerreri are within the Appellants' field of endeavor.

9 Even were Guerreri determined not to be within the Appellants' field  
10 of endeavor, we would conclude that the teachings of Guerreri are pertinent  
11 to a particular problem with which the Appellants are involved. The  
12 Appellants, like Guerreri, are concerned with the remote detonation of  
13 explosive charges. The Appellants state that advantages of the subject  
14 matter of claim 1 include that "the coded signal allows selective detonation  
15 of the explosive charges individually, in sequence, in patterns, etc., and the  
16 wireless signal does not transmit the power to initiate detonation of the  
17 explosive charge thereby reducing the risk of accidental detonation of the  
18 explosive charge." (Spec. 10, ll. 15-18). Guerreri also addresses the  
19 problem of reducing the risk of accidental detonation. (FF 9). Therefore,  
20 one of ordinary skill in the art would have looked to the teachings of  
21 Guerreri for guidance in addressing at least one problem with which the  
22 Appellants were involved. Guerreri is analogous art.

23 Snider teaches detonating an explosive charge in a perforating gun  
24 assembly positioned outside a casing wall in order to penetrate the wall. (FF  
25 1). Snider further teaches remotely detonating explosive charges on multiple  
26 perforating guns in sequence, that is, individually (FF 2) as well as

1   detonating such charges using radio signals received by radio receivers in  
2   the perforating guns (FF 3). Guerreri describes a system using radio signals  
3   to remotely initiate detonation of explosive charges and teaches that the  
4   system reduces the risk that the radio signal will detonate the charges  
5   simultaneously rather than individually. (FF 9). Therefore, we agree with  
6   the Examiner (Ans. 4-5) that it would have been obvious to use a remote  
7   detonating system according to the teachings of Guerreri to detonate charges  
8   in Snider's perforating guns "in order to achieve the benefits of a wireless  
9   system . . . as well as the desired effect of producing a blasting system,  
10   which is comprised of a plurality of detonator assemblies that are  
11   individually detonated by a wireless remote command source."

12       The Appellants do not appear to contest the Examiner's finding (Ans.  
13   5-6) that explosive bridge wire detonators are conventional. Indeed, Hudson  
14   (U.S. Patent 3,735,705, issued 29 May 1973) teaches that explosive bridge  
15   wire detonators are commonly used pyrotechnic devices. (Hudson, col. 1, ll.  
16   8-11).

17       "[W]hen a patent claims a structure already known in the prior art that  
18   is altered by the mere substitution of one element for another known in the  
19   field, the combination must do more than yield a predictable result." *KSR*  
20   *Int'l*, 127 S.Ct. at 1740. The subject matter of claim 1 substitutes a remote  
21   detonation system as taught by Guerreri (*see* FF 5) for the unspecified  
22   structure taught by Snider for sending electromagnetic signals to detonate  
23   the perforating charges (*see* FF 3); and further substitutes a firing  
24   mechanism including a conventional explosive bridge wire detonator ignited  
25   by the discharge of an undescribed energy storage and trigger means for a  
26   firing mechanism including an electric blasting cap ignited by the discharge

1 of a capacitor as taught in Guerreri (*see* FF 10). The Appellants do not  
2 appear to contest the Examiner's finding (Ans. 5) that "[i]t is considered  
3 well within the level of knowledge of one of ordinary skill in the art to  
4 substitute a wireless detonation system for a non-wireless system with the  
5 associated microprocessors and other structures that make the system  
6 wireless." (Ans. 5). Neither do the Appellants appear to contend that the  
7 modification of Guerreri's firing mechanism to substitute an explosive  
8 bridge wire detonator for an electric blasting cap would have been beyond  
9 the ordinary skill in the art. No arguments or evidence have been brought to  
10 our attention sufficient to demonstrate that the substitution of an explosive  
11 bridge wire detonator into a detonating system as taught by Guerreri or the  
12 use such a detonating system to detonate charges to perforate well casings as  
13 taught by Snider would have produced unpredictable or unexpected results.

14 On the record before us, the Appellants have not shown that the  
15 Examiner erred in rejecting claim 1 under § 103(a), that is, in concluding  
16 that the subject matter of claim 1 would have been obvious from Snider and  
17 Guerreri. Since the Appellants grouped claims 2-5 and 7 with claim 1 for  
18 purposes of contesting this grounds of rejection, the Appellants also have not  
19 shown that the Examiner erred in rejecting claims 2-5 and 7 under § 103(a).

20  
21 *B. The Rejection of Claim 6 Under § 103(a) as Being*  
22 *Unpatentable Over Snider in View of Guerreri and Neyer*

23 We addressed the Appellants' contentions that Snider and Guerreri are  
24 nonanalogous art and that there is no suggestion to combine the teachings of  
25 Snider and Guerreri in connection with our affirmance of the rejection of  
26 claims 1-5 and 7 under § 103(a). The Appellants provide no reason why the

1 Examiner might have erred in rejecting claim 6. Therefore, on the record  
2 before us, the Appellants have not shown that the Examiner erred in  
3 rejecting claim 6 under § 103(a).

4

5           C.     *The Rejection of Claims 8-12 and 14 Under § 103(a) as Being*  
6                   *Unpatentable Over Snider in View of Abouav, Guerreri and*  
7                   *Umphries*

8           The Appellants contest the rejection of claims 8-12 and 14 together in  
9 the Appeal Brief. (App. Br. 9.) We select claim 8 to be representative of the  
10 group. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2007). Setting aside contentions  
11 already addressed in connection with our affirmance of claims 1-5 and 7  
12 under § 103(a), the Appellants contend that Snider, Abouav, Guerreri and  
13 Umphries fail to suggest attaching an explosive charge in direct contact with  
14 the tubular. (App. Br. 12).

15           Snider teaches attaching a perforating gun (along with the charges  
16 carried by the gun) to a casing. (FF 4). We agree with the Examiner (Ans.  
17 12) that Umphries would have provided one of ordinary skill in the art a  
18 design incentive to attach the perforating gun to the casing so as to place a  
19 charge in intimate contact with a casing wall. By doing so, the one of  
20 ordinary skill in the art could control the force of the explosive charge  
21 against the casing. (FF 12-13). The Appellants do not appear to contend  
22 that modifying Snider's perforating gun so as to place a charge in intimate  
23 contact with the casing when the gun was attached to a casing would have  
24 been beyond the ordinary skill in the art. Umphries' teachings themselves  
25 would have provided one of ordinary skill in the art a basis for predicting the  
26 results to be obtained by attaching an explosive charge in intimate or direct  
27 contact with the casing. Therefore, it would have been obvious to one of

ordinary skill in the art to attach a perforating charge in direct contact with a casing.

On the record before us, the Appellants have not shown that the Examiner erred in rejecting claim 8 under § 103(a). Since the Appellants grouped claims 9-12 and 14 with claim 8 for purposes of contesting this ground of rejection, the Appellants also have not shown that the Examiner erred in rejecting claims 9-12 and 14 under § 103(a).

*D. The Rejection of Claim 13 Under § 103(a) as Being Unpatentable Over Snider in View of Abouav, Guerreri, Umphries and Neyer*

The Appellants' contest the rejection of claim 13 under § 103(a) solely on the basis of arguments relied on to contest the rejection of claims 1-5 and 7 under § 103(a). We sustain the rejection of claim 13 for the reasons given in connection with the affirmance of the rejection of claim 1.

### CONCLUSIONS OF LAW

On the record before us, the Appellants have not shown that the Examiner erred in rejecting claims 1-5 and 7 under § 103(a) as being unpatentable over Snider in view of Guerreri; claim 6 under § 103(a) as being unpatentable over Snider in view of Guerreri and Neyer; claims 8-12 and 14 under § 103(a) as being unpatentable over Snider in view of Abouav, Guerreri and Umphries; and claim 13 under § 103(a) as being unpatentable over Snider, Abouav, Guerreri, Umphries and Neyer.

### DECISION

We AFFIRM the Examiner's rejection of claims 1-13.

No time period for taking any subsequent action in connection with  
this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R.  
§ 1.136(a)(1)(iv) (2006).

AFFIRMED

vsh

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